

**Ferrous, Chapeltown Street
Manchester**

Energy Statement

JH Partners Consulting Engineers

1 Scotts
Bowes Offices
Lambton Park Estate
Chester le Street
Durham
DH3 4AN

Tel: 0191 385 3111
Fax: 0191 385 9111
www.jhpartners.co.uk

Document Ref: 1315//R/ME/ES
Revision: 00
Date 22nd October 2021

Document History

Rev	Date	Author	Checked	Comments
C1	17 th Oct 2021	SB	CJ	DRAFT – issued for comment
C2	20 th Oct 2021	SB	CJ	Page 9 – ‘4.1 Predicted Energy Demand’ amended Page 9 – ‘4.2 CO ₂ Emissions’ amended Page 12 – ‘6.0 Summary’ amended
00	22 nd Oct 2021	SB	CJ	Issued for planning

Contents

Section	Description	Page No
1.0	Introduction	4
2.0	Planning Policy	5
3.0	Energy Efficient Design	7
4.0	Predicted Energy Demand and CO ₂ Emissions (Fixed M&E Services)	9
5.0	Low or Zero Carbon (LZC) Technology Appraisal	10
6.0	Summary	12

1.0 Introduction

1.1 General

This Energy Statement has been prepared by JH Partners to accompany a planning application for the proposed development at Ferrous, Chapeltown Street, Manchester.

1.2 Outline Description of Development

The development will entail the erection of a 15 storey building comprising 107 apartments (Use Class C3), residential amenity facilities including a roof terrace, two ground floor commercial units (Use Class E / Sui Generis), multipurpose event pavilion (Use Class E / Sui Generis) and associated landscaping.

1.3 Schedule of Floor Space

The development will be apportioned accordingly:

- Commercial 192m² (GIA)
- Residential 8,642m² (GIA)

1.4 Phasing and Provisional Programme

It is envisaged that the development will be constructed in one phase; commencing Q2 / Q3 2022 with completion Q2 2024.

1.5 Outline Servicing Strategy

1.5.1 Commercial Units

Each commercial unit will be independently serviced (electricity, telecom and water) and will be provided on a 'shell and core' bases for fit out by the respective Tenant.

1.5.2 Apartments

Each apartment will be independently serviced (electricity, telecom and water) and will be fully fitted.

2.0 Planning Policy

Energy requirements are stipulated in Manchester's Local Development Framework : Core Strategy Development Plan Document : Policy EN 6 : Target Framework for CO₂ Reductions from Low or Zero Carbon Energy Supplies.

Applications for residential development of 10 or more units and all other development over 1,000m² will be expected as a minimum to meet the target shown in Tables 12.1 or 12.2, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated CO₂ emissions for all phases of the development.

Developments smaller than the above threshold, but involving the erection of a building or substantial improvement to an existing building will also be expected to meet the minimum target, where viable, but will not be expected to submit an energy statement.

The target framework relates to three broad development locations and their potential for low and zero carbon, decentralised energy. The areas are defined as follows:

- *Target 1 network development areas: locations where the proximity of new and existing buildings, the mix of uses and density of development provide the right conditions to support district heating (and cooling).*
- *Target 2 electricity intense areas: locations where the predominant building type has an all electric fit-out such as retail units and leisure complexes.*
- *Target 3 micro-generation areas: locations where lower densities and a fragmented mix of uses tend to mean that only building scale solutions are practical.*

Domestic CO₂ Emissions Reduction Targets

Table 12.1

Target	% Minimum requirement
Target 1 network development area	CHP / district heating anchor or connection or where not feasible, a 15% increase on Part L 2010
Target 2 electricity intense buildings	15% increase on Part L 2010
Target 3 micro generation area	15% increase on Part L 2010

Non-Domestic CO₂ Emissions Reduction Targets

Table 12.2

Target	% Minimum requirement
Target 1 network development area	CHP / district heating anchor or connection or where not feasible, a 15% increase on Part L 2010

Target	% Minimum requirement
Target 2 electricity intense buildings (Applies to commercial uses with a high proportion of emissions from electricity use (>45kg CO ₂ /m ²)	10% increase on Part L 2010
Target 3 micro generation area	15% increase on Part L 2010

Where the CO₂ emissions reduction required under any future revision to Part L of the building regulations becomes greater than the '% Minimum requirement', the reduction required under building regulations would apply.

Where the Council identifies an 'allowable solution', for example within an energy proposals plan, that would produce higher carbon reductions at no extra cost than that of achieving the '% minimum requirement' (or required under Building Regulations if greater) the higher percentage reduction will be required. The cost comparison is based on the cost of incorporating the 'allowable solution' at design stage.

The energy statement will be required to be submitted at the outset of any proposed development (outline application or before). Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO₂ mitigation, subject to the energy statement incorporating evidence such as modelling to demonstrate compliance.

CO₂ emission targets that apply to this development are highlighted above.

Note Part L 2010 has been superseded by Part L 2013. The stipulated increase on Part L 2010 (15%) translates to 9% increase on Part L 2013.

3.0 Energy Efficient Design

Reduction of energy and CO₂ emissions will primarily be afforded by virtue of 'Energy Efficient Design'.

3.1 U-Value Standards and Air Permeability Rate

The building fabric will be enhanced to exceed minimum the requirements of the Building Regulations, in accordance with the u-value standards and air permeability rates listed below.

U-Value Standards

Element	Minimum U-Value Standard W/m ² K	Proposed U-Value W/m ² K
Roof	0.20	0.15
Wall	0.30	0.22
Floor	0.25	0.20
Windows and pedestrian doors	2.00	1.30

Note Glazing will have a maximum solar transmittance of 35% (g-value 0.35).

Air Permeability Rate

Minimum Air Permeability Rate m ³ /(h.m ²) at 50Pa	Proposed Air Permeability Rate m ³ /(h.m ²) at 50Pa
10	3

3.2 Proposed M&E Services Strategy

All M&E services will comply with the minimum efficiency requirements stipulated in the Domestic and Non-Domestic Building Services Compliance Guides.

The following is the proposed M&E services strategy for the development.

Service	Commercial Units (Shell and Core) – Assumed	Apartments	Apartment Ancillary Areas
Space heating	High efficiency variable refrigerant flow (VRF) system Space heating in small transient spaces will be provided by direct electric panel heaters Time and temperature control	Direct electric panel heaters SMART time and temperature control	Direct electric panel heaters (entrance and ground floor amenity space)

Service	Commercial Units (Shell and Core) – Assumed	Apartments	Apartment Ancillary Areas
Space cooling	Space cooling will be provided by high efficiency variable refrigerant flow (VRF) system Time and temperature control	N/A	N/A
Mechanical ventilation	Local mechanical ventilation with heat recovery (MVHR) Demand control	Continuous mechanical supply and extract with heat recovery (MVHR) Demand control (boost)	N/A
Hot water heating	Local direct electric water heaters Time and temperature control	Direct electric hot water cylinder SMART time and temperature control	N/A
Internal lighting	Low energy LED type Presence control	Low energy LED type	Low energy LED type Presence control
LZC system	N/A	Central solar photovoltaic (PV) system	N/A

3.3 Other Energy Efficiency Measures

Other energy efficiency measures will include:

- High efficiency passenger lifts
- High efficiency pump motors (central cold water plant)
- Low energy LED type external lighting with time and photocell control

4.0 Predicted Energy Demand and CO₂ Emissions (Fixed M&E Services)

Preliminary SBEM assessment (commercial units) and SAP assessments (apartments) have been conducted for the purpose of predicting energy demand and CO₂ emission.

4.1 Predicted Energy Demand

Element	Floor Area m ²	Energy Demand kWh/m ²	Energy Demand kWh (Annual)
Commercial units	192	68.60	13,171
Apartments	6,792	63.58	431,835
Apartment ancillary areas	1,849	27.75	51,310
		Total	496,316

4.2 CO₂ Emissions

Target Emissions Rate (TER)

Element	Floor Area m ²	Part L 2013 CO ₂ Emissions kgCO ₂ /m ² (TER)	Total CO ₂ Emissions kg (Annual)
Commercial units	192	24.9	4,781
Apartments	6,792	21.71	147,454
Apartment ancillary areas	1,849	13.70	25,331
		Total	177,566

Dwelling Emission Rate (DER / Building Emissions Rate (BER)

Element	Floor Area m ²	Predicted CO ₂ Emissions kgCO ₂ /m ² (BER / DER)	Total CO ₂ Emissions kg (Annual)
Commercial units	192	21.9	4,205
Apartments	6,792	19.62	133,259
Apartment ancillary areas	1,849	12.47	23,057
PV system (refer to clause 5.4)	N/A	N/A	-2,250
		Total	158,271

The resulting variance between Part L 2013 CO₂ emissions (TER) and the predicted CO₂ emissions (BER / DER) of Ferrous equates to a **10.87% reduction** in CO₂ emissions.

5.0 Low or Zero Carbon (LZC) Technology Appraisal

5.1 General

Low and zero carbon (LZC) technology is the term given to technologies that emit low levels of CO₂. The incorporation of these technologies is most effective within buildings with a highly energy efficient fabric after heat demand and loss have been reduced to a minimum.

The choice of LZC technology will depend on conditions specific to a proposed development. Listed below are the most commonly used LZC technologies for developments of this type:

1. Combined heat and power (CHP) / district heating
2. Solar hot water (SHW)
3. Photovoltaics (PV)
4. Wind
5. Ground source heat pump (GSHP)
6. Air source heat pump (ASHP)
7. Biomass heating
8. Biomass or gas CHP

5.2 Combined Heat and Power (CHP) / District Heating

There is presently no established CHP / district heating network in the vicinity of the proposed development site.

5.3 Solar Hot Water (SHW)

There will be an intermittent hot water demand due to the predominately residential nature of the development (with morning and evening peaks). On this basis, it is considered that there is not a suitable base load for the efficient use of SHW.

The storage and distribution of SHW is also not considered cost effective in the case of independently serviced apartments (as is the case at this development).

Furthermore, it is considered that the roof area of this development will be more suited to the installation of a PV system rather than a SHW system.

5.4 Photovoltaics (PV)

PV is considered suitable for this development.

It is proposed to install a roof mounted PV system to provide an element of on-site electricity generation and to further reduce energy and CO₂ emissions over and above the 'Energy Efficient Design'.

The PV system will maximise the available roof space and the following output, yield and CO₂ reduction will be targeted:

- | | |
|------------------------------------|----------|
| ○ Peak output | 18.0kW |
| ○ Annual yield | 9,650kWh |
| ○ Annual CO ₂ reduction | 2,250kg |
| ○ Equivalent trees planted | 103 |

5.5 Wind

City centre locations are usually unsuitable for the installation of wind turbines due to:

- Reliability of wind speed
- Visual impact
- Noise
- Nuisance shadow flicker caused by rotating blades
- Public safety (possibility of falling parts in the event of turbine damage)

5.6 Ground Source Heat Pump (GSHP)

Due to the area of the development site, relative to the predicted heat demand of the building, it is considered that there is insufficient space for the installation of ground collectors or boreholes to support a GSHP system.

Furthermore, overshadowing from this development and surrounding buildings would limit the heat capacity of any GSHP system.

5.7 Air Source Heat Pump (ASHP)

Although individual ASHP's (air to water) are considered suitable for providing space heating and hot water heating in dwelling houses, their suitability for high rise multi-residential buildings is limited by the availability of outside space for installation of the outdoor units and the visual impact of such units.

Furthermore, the installation cost of individual air source heat pumps relative to direct electric heating is considered cost prohibitive (additional circa £5,000 to £6,000 per apartment).

5.8 Biomass Heating

The provision of biomass heating requires a central biomass storage facility, central boiler plant, heating distribution system and consumer interface units.

For this reason, and other factors (listed below), biomass heating is not considered viable for this development.

- Source of biomass fuel and security of supply
- Access and frequency of biomass fuel deliveries in a city centre location
- Additional space required for biomass fuel storage and boiler plant
- Boiler flue considerations in a city centre location
- Ash storage and removal
- Very high installation and ongoing maintenance costs

5.9 Biomass or Gas Combined Heat and Power (CHP)

For similar reasons described above (Biomass Heating), biomass or gas CHP is not considered viable for this development.

6.0 Summary

Energy and carbon reduction requirements imposed by Building Regulations (Part L 2013) and Planning Policy (Policy EN 6) will be met by 'Energy Efficient Design'.

Commercial Units

○ Predicted energy demand	13,171kWh
○ CO ₂ emissions – Part L 2013 (TER)	4,781kg
○ Predicted CO ₂ emissions (BER) – Energy Efficient Design	4,205kg

Apartments

○ Predicted energy demand	431,835kWh
○ CO ₂ emissions – Part L 2013 (TER)	147,454kg
○ Predicted CO ₂ emissions (DER) – Energy Efficient Design	133,259kg

Apartment Ancillary Areas

○ Predicted energy demand	51,310kWh
○ CO ₂ emissions – Part L 2013 (TER)	25,331kg
○ Predicted CO ₂ emissions (BER) – Energy Efficient Design	23,057kg

In order to further reduce energy and CO₂ emissions, a roof mounted PV system will be provided:

○ Annual yield	9,650kWh
○ Annual CO ₂ reduction	2,250kg
○ Equivalent trees planted	103

The resulting variance between Part L 2013 CO₂ emissions (TER) and predicted CO₂ emissions (BER / DER) equates to **less 10.87%**

Furthermore, due to the increasing number of national solar / wind farms and decreasing carbon intensity of grid supplied electricity, it is anticipated that the above predicted CO₂ emissions will reduce year on year over the lifetime of the development.